FCC CO-LOCATION RADIO TEST REPORT

FCC ID	:	**2AIMRRD13**
Equipment	:	**Xiaomi Mesh System AC1200**
Brand Name	:	**Xiaomi**
Model Name	:	**RD13**
Applicant	:	**Beijing Xiaomi Electronics Co., Ltd. Room 802, Floor 8, Building 5, No.15 KeChuang 10th Road, Beijing Economic and Technological Development Zone, Beijing City, China.**
Manufacturer	:	**Beijing Xiaomi Electronics Co., Ltd. Room 802, Floor 8, Building 5, No.15 KeChuang 10th Road, Beijing Economic and Technological Development Zone, Beijing City, China.**
Standard	:	**FCC Part 15 Subpart E §15.407**

The product was received on May 09, 2024 and testing was performed from May 17, 2024 to May 30, 2024. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory
No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010

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History of this test report

Report No.	Version	Description	Issue Date
FR450101C	01	Initial issue of report	Jun. 06, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.407(b)	Unwanted Emissions	Pass	1.63 dB under the limit at 2389.94 MHz
3.2	15.203	Antenna Requirement	Pass	-

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”.
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Lewis Ho

Report Producer: Michelle Chen

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature
General Specs Wi-Fi 2.4GHz 802.11b/g/n and Wi-Fi 5GHz 802.11a/n/ac. **Antenna Type** WLAN: **<Ant. 1>**: Dipole Antenna **<Ant. 2>**: Dipole Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	Ant. 1: 2.64 Ant. 2: 2.43
5150 MHz ~ 5250 MHz	Peak Gain (dBi)	Ant. 1: 2.36 Ant. 2: 2.52

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Location

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010 TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH12-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW3786

1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC Part 15 Subpart E
- FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 987594 D02 U-NII 6 GHz EMC Measurement v01r01
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst plane recorded in this report.

2.1 Carrier Frequency and Channel

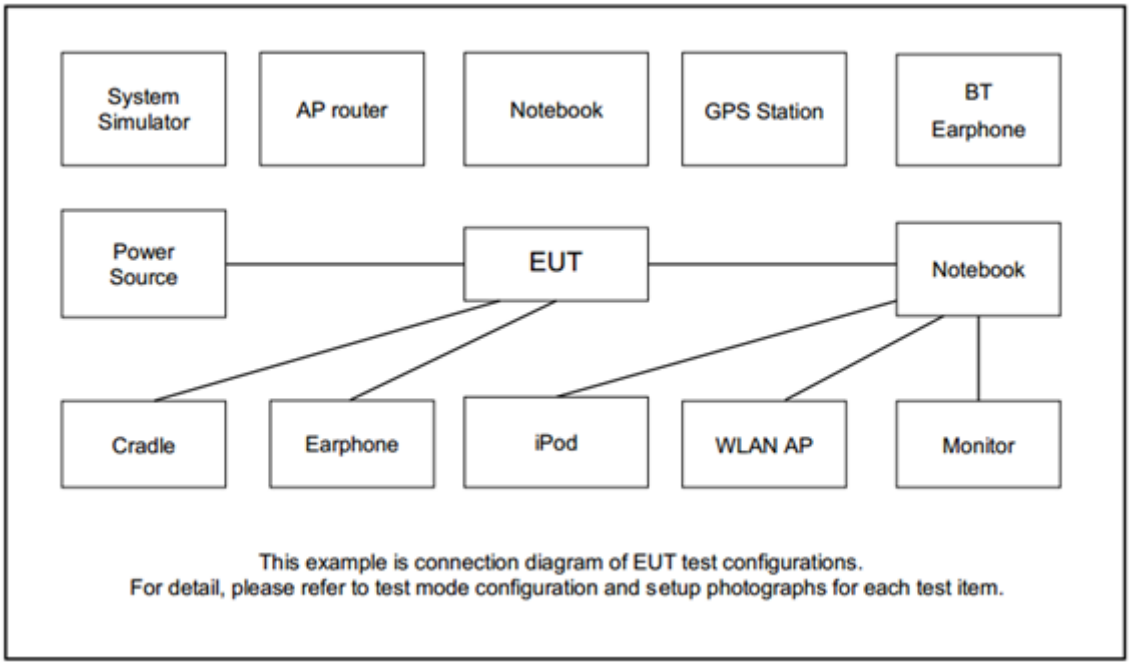
2400-2483.5 MHz		5150 MHz ~ 5250 MHz	
802.11n HT40		802.11n HT40	
Channel	Freq. (MHz)	Channel	Freq. (MHz)
03	2422	38	5190

2.2 Test Mode

<Co-Location>

Test Mode	Modulation	Data Rate
Mode 1	WLAN 2.4GHz 802.11n HT40 + WLAN 5GHz 802.11n HT40 for MIMO <Ant. 1+2>	MCS0 + MCS0

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	Latitude 3400	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.5 EUT Operation Test Setup

The RF test items, utility “MP Tool” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

3 Test Result

3.1 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.1.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) Unwanted spurious emissions falls in restricted bands shall comply with the general field strength limits as below table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBµV/m)
- 27	68.3

(3) KDB789033 D02 v02r01 G)2)c)

(i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of −27 dBm/MHz.

(ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000 MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW ≥ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

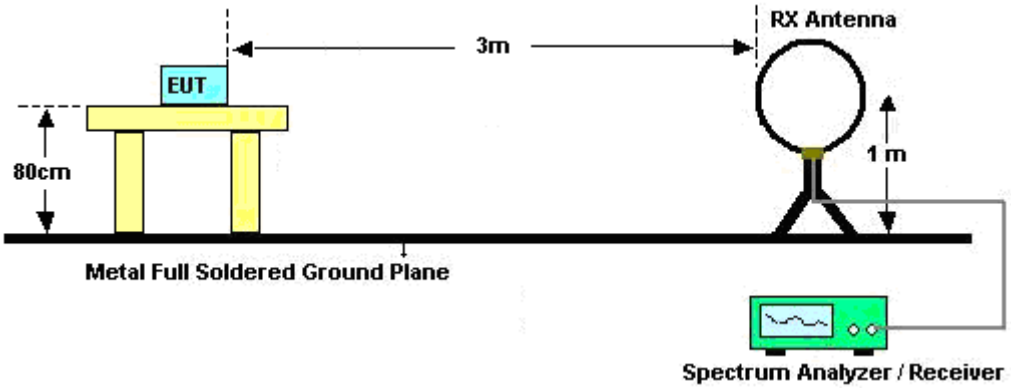
(3) Procedures for Average Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

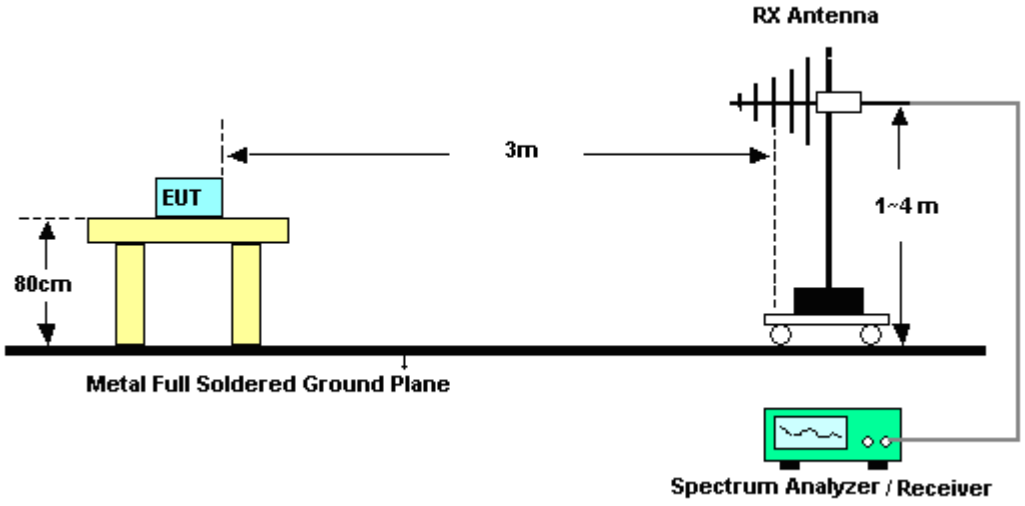
2. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
3. The EUT is set 3 meters away from the receiving antenna which is mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as "-".
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as "-".

3.1.4 Test Setup

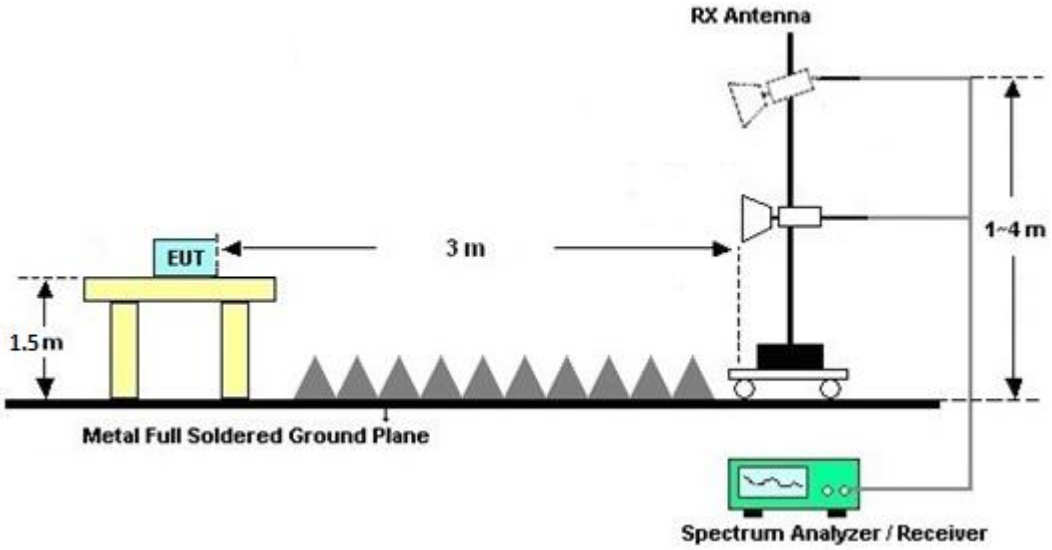
For radiated emissions below 30MHz



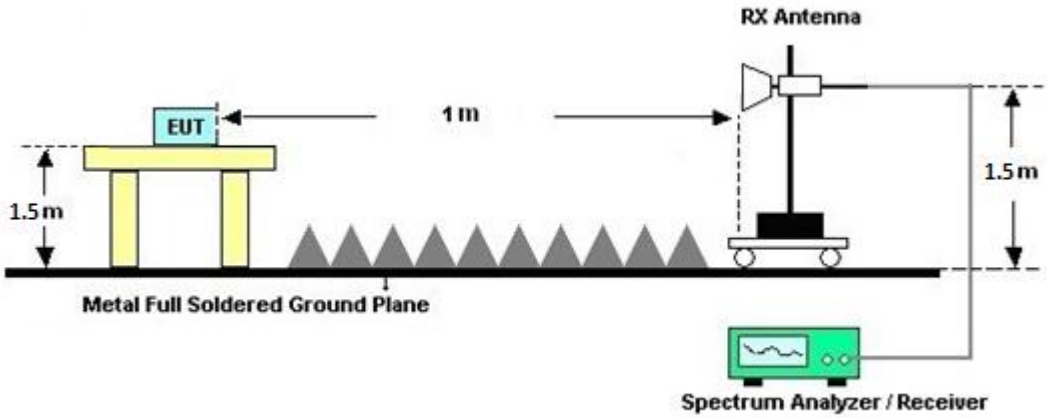
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.1.7 Duty Cycle

Please refer to Appendix C.

3.1.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix A and B.

3.2 Antenna Requirements

3.2.1 Standard Applicable

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 12, 2023	May 17, 2024~ May 30, 2024	Sep. 11, 2024	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	37059 & 01	30MHz~1GHz	Nov. 03, 2023	May 17, 2024~ May 30, 2024	Nov. 02, 2024	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02114	1GHz~18GHz	Jul. 31, 2023	May 17, 2024~ May 30, 2024	Jul. 30, 2024	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00993	18GHz-40GHz	Nov. 24, 2023	May 17, 2024~ May 30, 2024	Nov. 23, 2024	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 20, 2024	May 17, 2024~ May 30, 2024	Mar. 19, 2025	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	May 23, 2023	May 17, 2024~ May 21, 2024	May 22, 2024	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	May 22, 2024	May 22, 2024~ May 30, 2024	May 21, 2025	Radiation (03CH12-HY)
Preamplifier	E-INSTRUMENT TECH LTD.	ERA-100M-18G-56-01-A70	EC1900249	1GHz-18GHz	Dec. 20, 2023	May 17, 2024~ May 30, 2024	Dec. 19, 2024	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 07, 2023	May 17, 2024~ May 30, 2024	Dec. 06, 2024	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Jan. 10, 2024	May 17, 2024~ May 30, 2024	Jan. 09, 2025	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12SS	SN2	1.2GHz Low Pass Filter	Mar. 12, 2025	May 17, 2024~ May 30, 2024	Mar. 13, 2024	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN2	3GHz High Pass Filter	Mar. 12, 2025	May 17, 2024~ May 30, 2024	Mar. 13, 2024	Radiation (03CH12-HY)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40ST	SN2	6.75GHz High Pass Filter	Mar. 12, 2025	May 17, 2024~ May 30, 2024	Mar. 13, 2024	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 18, 2023	May 17, 2024~ May 30, 2024	Dec. 17, 2024	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Dec. 18, 2023	May 17, 2024~ May 30, 2024	Dec. 17, 2024	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803953/2	30MHz~40GHz	Dec. 18, 2023	May 17, 2024~ May 30, 2024	Dec. 17, 2024	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP210090	N/A	Sep. 08, 2023	May 17, 2024~ May 30, 2024	Sep. 07, 2024	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	May 17, 2024~ May 30, 2024	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	May 17, 2024~ May 30, 2024	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	May 17, 2024~ May 30, 2024	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	May 17, 2024~ May 30, 2024	N/A	Radiation (03CH12-HY)

5 Measurement Uncertainty

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.1 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.3 dB

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.8 dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.3 dB

Appendix A. Radiated Spurious Emission

Test Engineer :	Jesse Fan, Tim Lee and Wilson Wu	**Temperature :**	20~25°C
		Relative Humidity :	50~65%

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40_Tx_Ch03 (Band Edge @ 3m)

BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 Ch03 2422MHz		2384.2	57.01	-16.99	74	45.98	27.44	17.23	33.64	307	66	P	H
		2389.94	45.5	-8.5	54	34.4	27.5	17.24	33.64	307	66	A	H
	*	2422	96.53	-	-	85.28	27.6	17.3	33.65	307	66	P	H
	*	2422	88.69	-	-	77.44	27.6	17.3	33.65	307	66	A	H
		2494.05	56.85	-17.15	74	45.03	28	17.5	33.68	307	66	P	H
		2492.23	46.05	-7.95	54	34.23	28	17.5	33.68	307	66	A	H
		2381.54	62.14	-11.86	74	51.12	27.42	17.23	33.63	279	57	P	V
		2389.94	52.37	-1.63	54	41.27	27.5	17.24	33.64	279	57	A	V
	*	2422	108.89	-	-	97.64	27.6	17.3	33.65	279	57	P	V
	*	2422	101.14	-	-	89.89	27.6	17.3	33.65	279	57	A	V
		2491.25	61.69	-12.31	74	49.87	28	17.5	33.68	279	57	P	V
		2492.09	50.85	-3.15	54	39.03	28	17.5	33.68	279	57	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 Tx_Ch38 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 Ch38 5190MHz		5032.24	55.73	-18.27	74	44.48	33.33	10.93	33.01	100	140	P	H
		5147.94	46.06	-7.94	54	34.71	33.21	11.19	33.05	100	140	A	H
	*	5190	101.33	-	-	89.99	33.12	11.28	33.06	100	140	P	H
	*	5190	93.93	-	-	82.59	33.12	11.28	33.06	100	140	A	H
		5355.56	53.87	-20.13	74	41.66	33.19	12.14	33.12	100	140	P	H
		5398.96	45.08	-8.92	54	32.75	33.1	12.37	33.14	100	140	A	H
		5149.76	60.99	-13.01	74	49.65	33.2	11.19	33.05	100	133	P	V
		5150	51.9	-2.1	54	40.56	33.2	11.19	33.05	100	133	A	V
	*	5190	111.21	-	-	99.87	33.12	11.28	33.06	100	133	P	V
	*	5190	103.7	-	-	92.36	33.12	11.28	33.06	100	133	A	V
		5360.6	55.49	-18.51	74	43.26	33.18	12.17	33.12	100	133	P	V
		5351.92	47.52	-6.48	54	35.32	33.2	12.12	33.12	100	133	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz + Band 1 - 5150~5250MHz

802.11n HT40_Tx_Ch03 + 802.11n HT40_Tx_Ch38 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 Ch03 + 802.11n HT40 Ch38		4844	53.84	-20.16	74	42.38	32.38	11.76	32.68	100	132	P	H
		4844	44.91	-29.09	74	33.45	32.38	11.76	32.68	100	132	A	H
		7266	45.26	-28.74	74	59.11	37.14	15	65.99	-	-	P	H
		10380	50.33	-17.87	68.2	61.45	39.04	17.44	67.6	307	248	P	H
		10380	40.1	-13.9	54	51.22	39.04	17.44	67.6	307	248	A	H
		15570	50.47	-23.53	74	57.03	38.42	22.31	67.29	287	169	P	H
		15570	42.18	-11.82	54	48.74	38.42	22.31	67.29	287	169	A	H
													H
													H
													H
													H
													H
		4844	53.5	-20.5	74	42.04	32.38	11.76	32.68	182	354	P	V
		4844	44.93	-29.07	74	33.47	32.38	11.76	32.68	182	354	A	V
		7266	44.75	-29.25	74	58.6	37.14	15	65.99	-	-	P	V
		10380	49.45	-18.75	68.2	60.57	39.04	17.44	67.6	202	357	P	V
		10380	39.37	-14.63	54	50.49	39.04	17.44	67.6	202	357	A	V
		15570	51.75	-22.25	74	58.31	38.42	22.31	67.29	178	245	P	V
		15570	43.02	-10.98	54	49.58	38.42	22.31	67.29	178	245	A	V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

2.4GHz 2400~2483.5MHz + Band 1 - 5150~5250MHz

802.11n HT40_Tx_Ch03 + 802.11n HT40_Tx_Ch38 (SHF @ 1m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
Simultaneously		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		27401.7	43.26	-24.94	68.2	37.91	39.7	18.59	52.94	-	-	P	H
		36876	47.8	-20.4	68.2	35.12	42.76	24.42	54.5	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
11g(n40)													H
Ch03+													H
11a(n40) Ch38		28489.5	44.99	-23.21	68.2	39.63	40.44	19.11	54.19	-	-	P	V
SHF		36447	47.09	-26.91	74	36.12	42.82	22.95	54.8	-	-	P	V
													V
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													V
													V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

2.4GHz 2400~2483.5MHz + Band 1 - 5150~5250MHz

802.11n HT40_Tx_Ch03 + 802.11n HT40_Tx_Ch38 (LF @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		72.93	25.44	-14.56	40	40.58	13.16	1.6	29.9	-	-	P	H
		154.2	29.75	-13.75	43.5	40.09	17.14	2.35	29.83	-	-	P	H
		274.35	28.05	-17.95	46	35.93	18.81	2.92	29.61	-	-	P	H
		551.3	29.47	-16.53	46	28.69	26	3.95	29.17	-	-	P	H
		748.7	33.33	-12.67	46	28.93	28.37	4.96	28.93	-	-	P	H
		967.8	36.68	-17.32	54	28.23	31.09	5.61	28.25	-	-	P	H
													H
													H
													H
													H
11g(n40)													H
Ch03+													H
11a(n40) Ch38		39.45	35.85	-4.15	40	44.19	20.2	1.12	29.66	111	175	Q	V
LF		91.02	25.73	-17.77	43.5	38.71	15.21	1.72	29.91	-	-	P	V
		278.67	24.61	-21.39	46	32.45	18.81	2.95	29.6	-	-	P	V
		671	30.94	-15.06	46	28.97	26.56	4.47	29.06	-	-	P	V
		830.6	34.1	-11.9	46	29.18	28.67	4.99	28.74	-	-	P	V
		962.9	36.84	-17.16	54	28.47	31.08	5.56	28.27	-	-	P	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 01 5955MHz		5925	55.45	-32.75	88.2	54.51	32.22	4.58	35.86	103	308	P	H
		5925	43.54	-24.66	68.2	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Margin(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 5925MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Margin(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -32.75(dB)

For Average Limit @ 5925MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Margin(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -24.66(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix B. Radiated Spurious Emission Plots

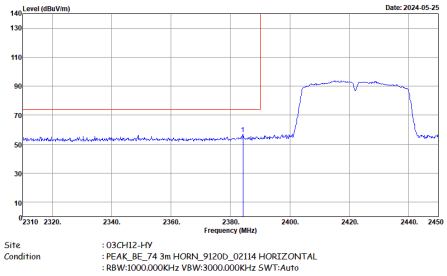
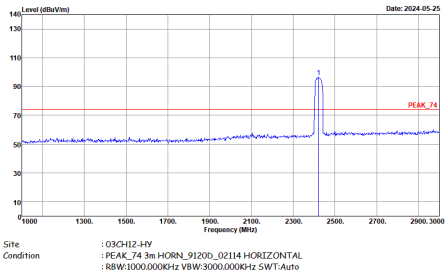
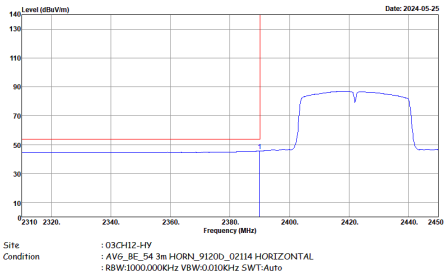
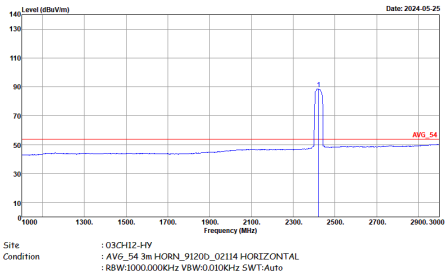
Test Engineer :	Jesse Fan, Tim Lee and Wilson Wu	**Temperature :**	20~25°C
		Relative Humidity :	50~65%

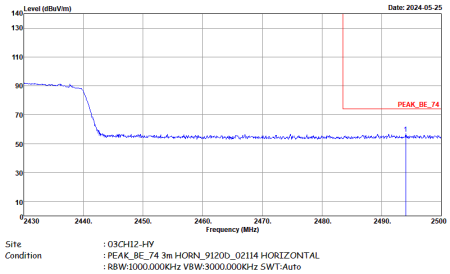
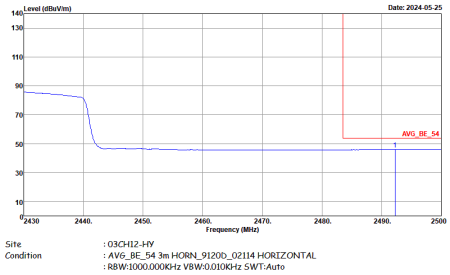
Note symbol

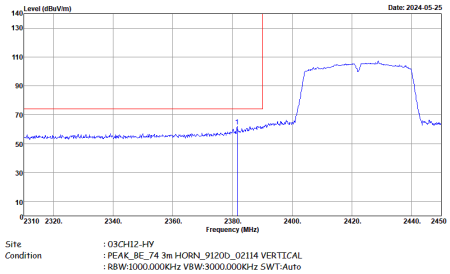
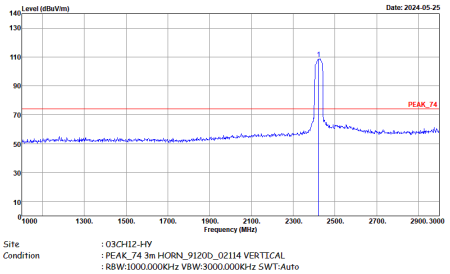
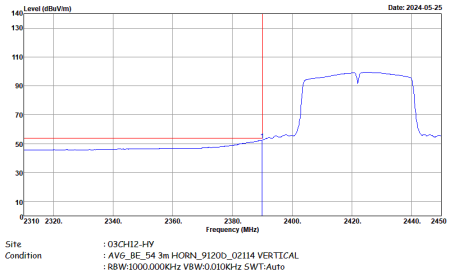
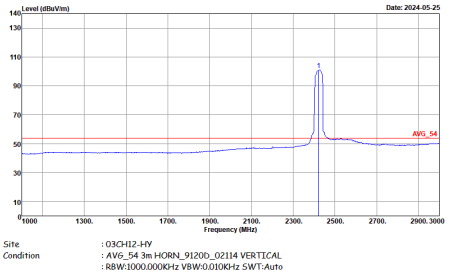
-L	**Low channel location**
-R	**High channel location**

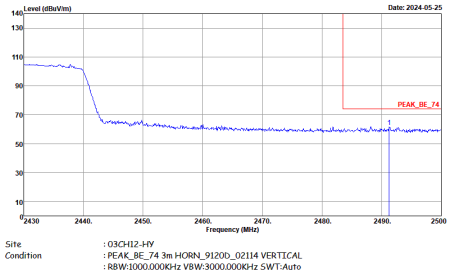
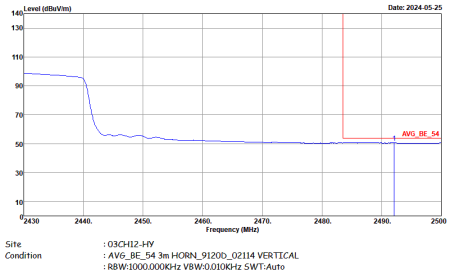
2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40_Tx_Ch03 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40_Tx_Ch03 2422MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		

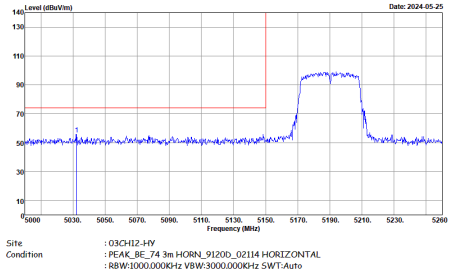
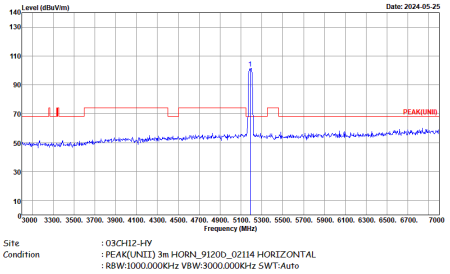
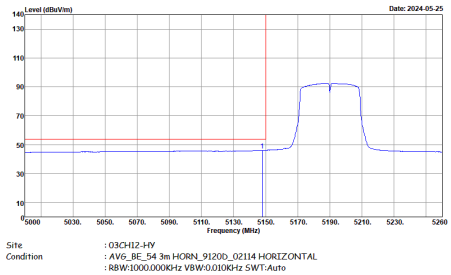
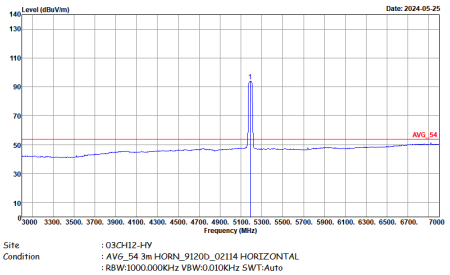
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40_Tx_Ch03 2422MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		

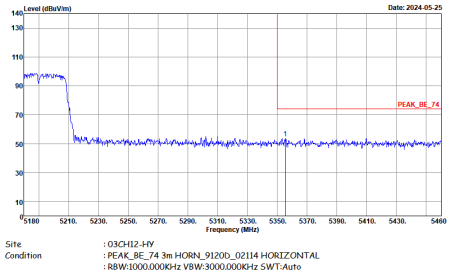
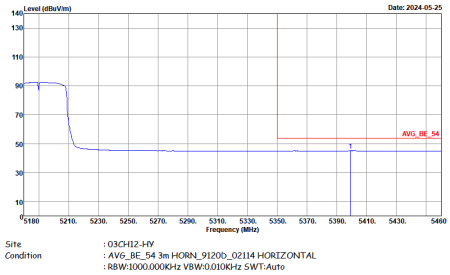
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40_Tx_Ch03 2422MHz - R	
1+2	Vertical	Fundamental
Peak		
Avg.		

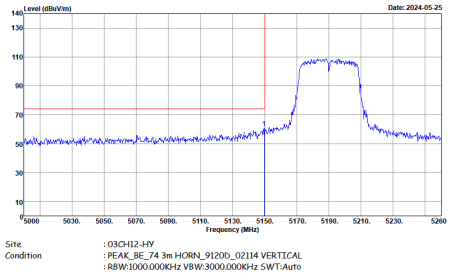
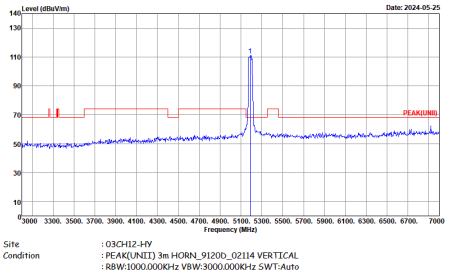
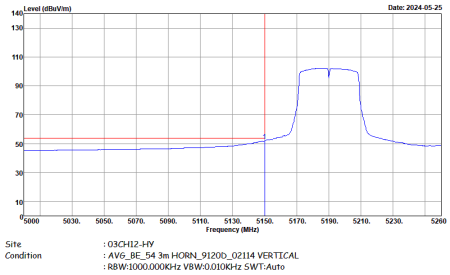
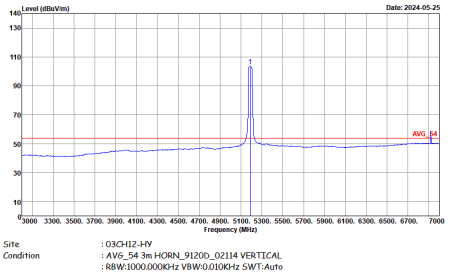
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40_Tx_Ch03 2422MHz - R	
1+2	Vertical	Fundamental
Peak		
Avg.		

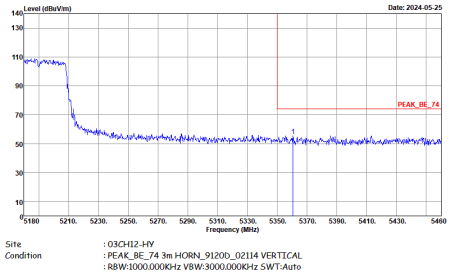
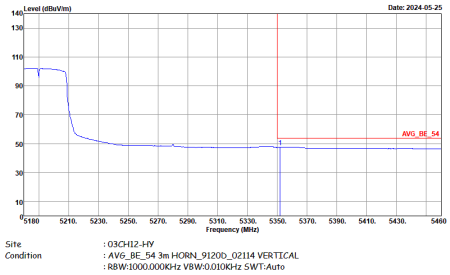
Band 1 5150~5250MHz

WIFI 802.11n HT40 Tx_Ch38 (Band Edge @ 3m)

BT	5GHz 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40_Tx_Ch38 5190MHz-L	
1+2	Horizontal	Fundamental
Peak		
Avg		

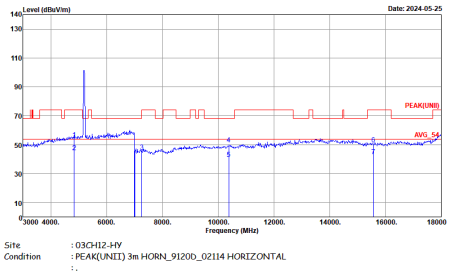
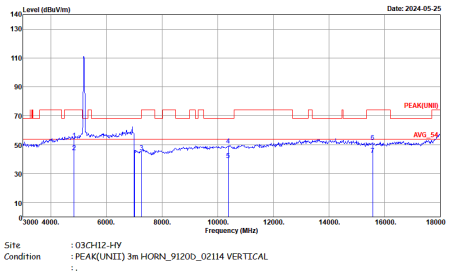
BT	5GHz 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40_Tx_Ch38 5190MHz-L	
1+2	Horizontal	Fundamental
Peak		
Avg		

BT	5GHz 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40_Tx_Ch38 5190MHz-R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_02114 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_02114 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_02114 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH12-HY Condition : AVG_54 3m HORN_9120D_02114 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto

BT	5GHz 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40_Tx_Ch38 5190MHz-R	
1+2	Vertical	Fundamental
Peak		
Avg		

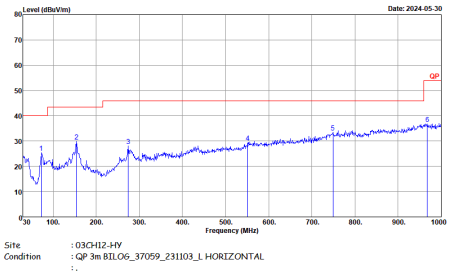
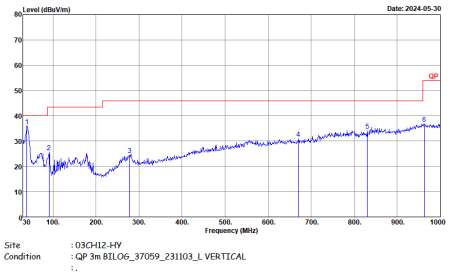
2.4GHz 2400~2483.5MHz + Band 1 - 5150~5250MHz

802.11n HT40_Tx_Ch03 + 802.11n HT40_Tx_Ch38 (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT40_Tx_Ch03+802.11n HT40_Tx_Ch38	
Simultaneously	Horizontal	Vertical
Peak Avg.		

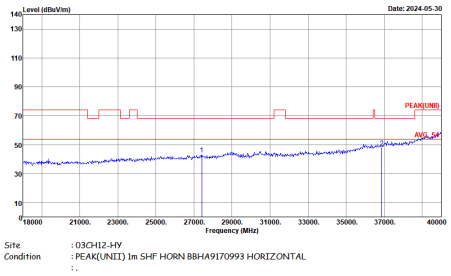
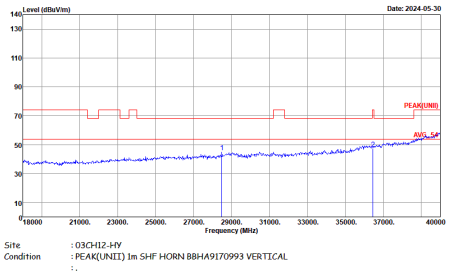
2.4GHz 2400~2483.5MHz + Band 1 - 5150~5250MHz

802.11n HT40_Tx_Ch03 + 802.11n HT40_Tx_Ch38 (LF @ 3m)

WIFI	2.4GHz 2400~2483.5MHz LF @ 3m	
ANT	802.11n HT40_Tx_Ch03+802.11n HT40_Tx_Ch38	
Simultaneously	Horizontal	Vertical
Peak Avg.		

2.4GHz 2400~2483.5MHz + Band 1 - 5150~5250MHz

802.11n HT40_Tx_Ch03 + 802.11n HT40_Tx_Ch38 (SHF @ 1m)

WIFI	2.4GHz 2400~2483.5MHz SHF @ 1m	
ANT	802.11n HT40_Tx_Ch03+802.11n HT40_Tx_Ch38	
Simultaneously	Horizontal	Vertical
Peak Avg.		

Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	2.4GHz 802.11n HT40	100.00	-	-	10Hz
1+2	5GHz 802.11n HT40	100.00	-	-	10Hz

MIMO <Ant. 1+2>

2.4GHz 802.11n HT40	5GHz 802.11n HT40